

1.2 Cellular Structure and Organisation

1.

- (a) Complete the diagram of a mitochondrion and **label four** structures **clearly**. [5]



- (b) (i) What process takes place in the mitochondrion? [1]

.....

- (ii) Name a tissue where you would expect to find large numbers of mitochondria. [1]

.....

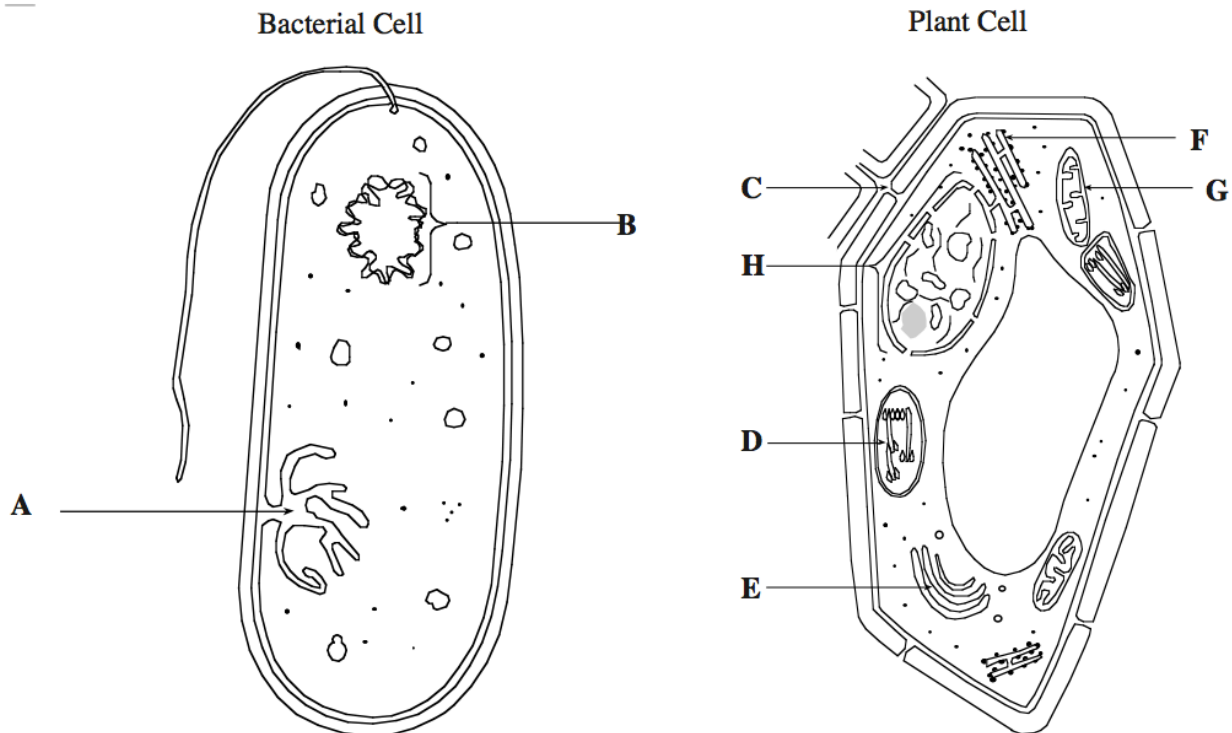
- (iii) Explain why mitochondria are particularly important **in this tissue**. [1]

.....

(Total 8 marks)

2.

Carefully study the drawings below made from observations of electron micrographs.



- (a) Cells are divided into two major groups according to their structures. To which group do the above cells belong. [2]

Bacterial cell

Plant cell

- (b) Name the structures indicated by the following letters on the diagrams above. [3]

A

B

C

- (c) State **one** difference between the structures labelled **B** and **H**. [1]

.....

.....

- (d) State the **main** function of the following structures. [4]

D

E

F

G

(Total 10 marks)

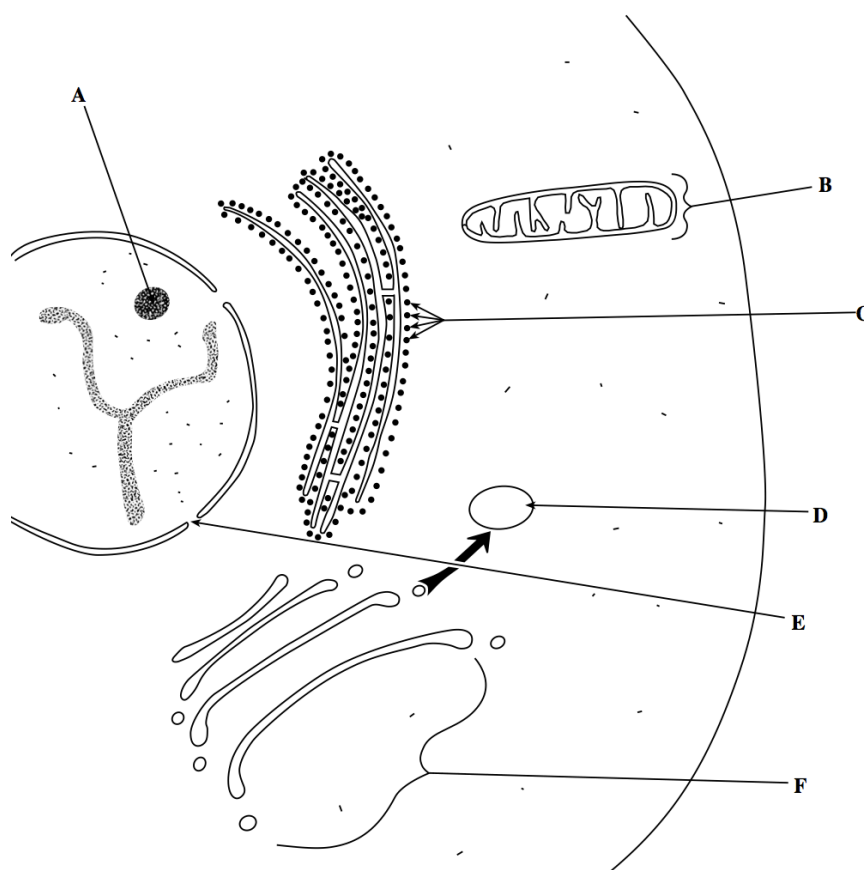
3.

Complete the following table to compare the structure of plant cells, bacteria and viruses, by placing a tick in appropriate boxes. Each row may have **one, two or three** ticks. [6]

<i>Structural Feature</i>	<i>plant cells</i>	<i>bacteria</i>	<i>viruses</i>
may contain mitochondria			
have cell walls			
may contain DNA			
may contain chloroplasts			
do not have a membrane-bound nucleus			
may have plasmids			

4.

(b) The diagram shows part of a eukaryotic cell.



(i) Give the name of structures A and B. [2]

A

B

(ii) What is the function of feature E? [1]

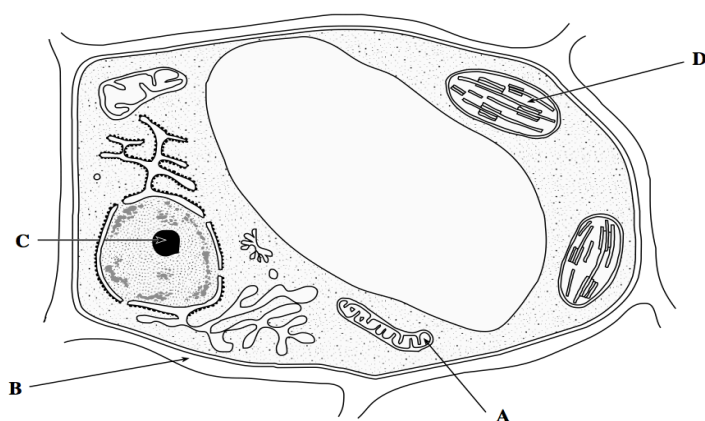
.....

- (c) The functions of organelles within the cell are related. Complete the table to show the relationship between the organelles in the table. [2]

<i>Organelles</i>	<i>Relationship of function.</i>
B and C	ATP molecules produced in B are used by organelle C to link amino acids together.
A and C	
F and D	

5.

The diagram below shows a plant cell. Name the organelles labelled **A** to **D** and for each indicate its main function.



A Name
 Function
 [2]

B Name
 Function
 [2]

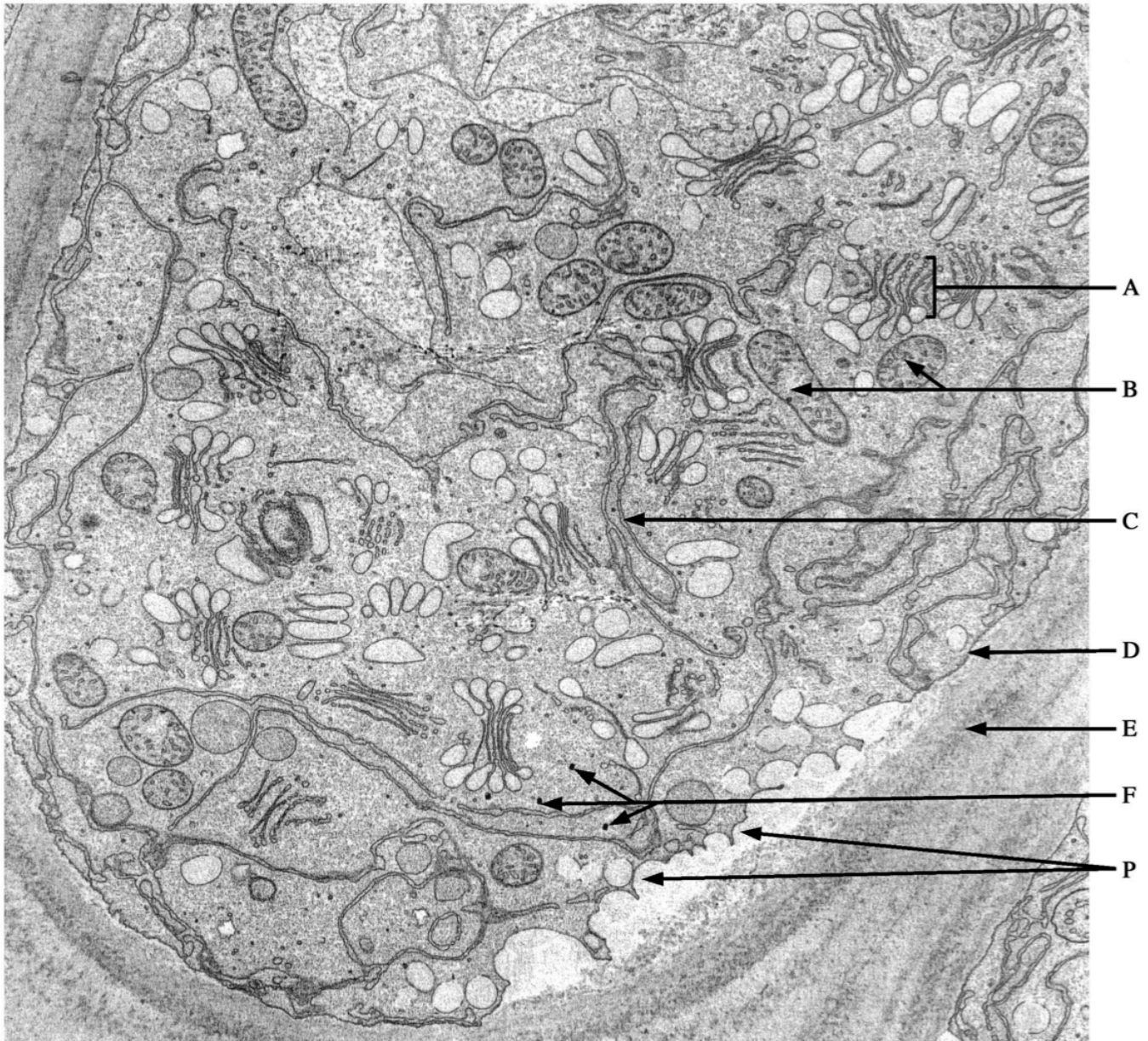
C Name
 Function
 [2]

D Name
 Function
 [2]

(Total 8 marks)

6.

___ The electronmicrograph shows part of a **plant** cell.



Plant Physiology, Moiré, Jones, Mollenhauer. 4th Ed, 1967

Questions relating to this photo are on the next page.

(a) Identify the structures labelled A-F.

[6]

A

B

C

D

E

F

(b) State the name of **two** organelles or structures which may be found in plant cells, but which are not shown in this electronmicrograph. [2]

.....

.....

(c) Substance **P** (shown in the diagram) has been assembled in the Golgi apparatus. By means of labelled diagrams show how it is secreted from the cell. [3]

7.

- (i) Draw and label a simple diagram of a ribosome. [2]

- (ii) What **two** chemical components make up a ribosome? [2]

1

2

- (iii) On which membranous structure in a cell would you expect to find ribosomes? [1]

.....

- (iv) What is the function of ribosomes? [1]

.....

- (v) State precisely where in a cell ribosomes are synthesised. [1]

.....

(Total 7 marks)

8.

Recent progress has been made towards effective treatment for cystic fibrosis. The key problem remains developing an effective delivery system to introduce the replacement gene into the cells. One delivery system is a virus which is known not to cause disease in humans.

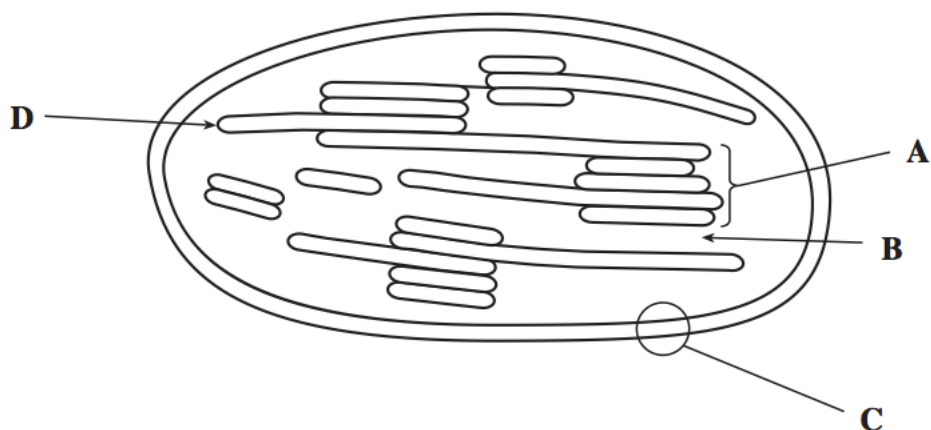
- (a) What are the **two** major components of a virus? [2]

1

2

9.

The diagram below shows the structure of a chloroplast.



(a) Name the structures labelled:

[4]

A

B

C

D

(b) One organic compound which is found in the internal membranes of the chloroplast, never occurs in any other plant or animal organelle. Name this compound. [1]

.....

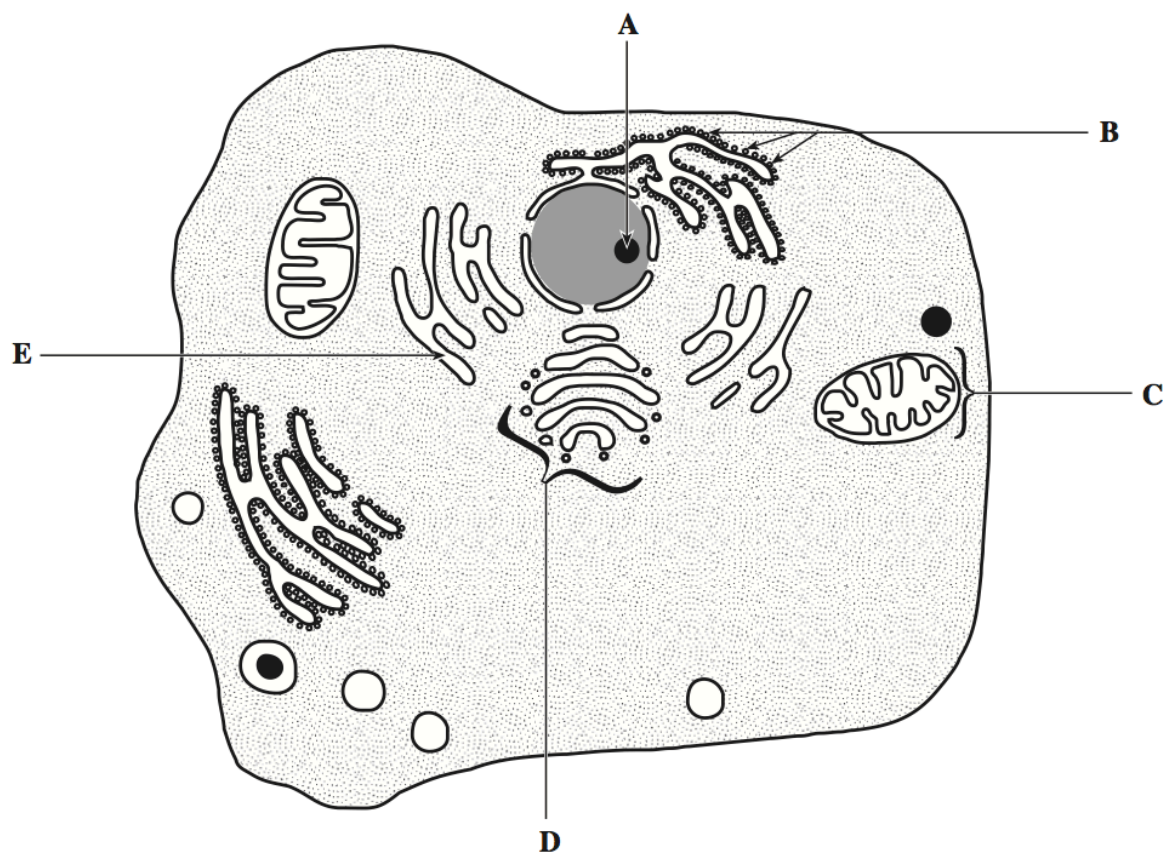
(c) Chloroplasts are said to be self replicating.
Name **one** structure (not shown in the diagram) which would be involved in the production of new chloroplasts. [1]

.....

(Total 6 marks)

10.

The diagram shows a cell viewed using an electron microscope.



- (a) (i) Name the structures labelled A to E. [5]

A

B

C

D

E

- (ii) Using the appropriate letter, identify [2]

one structure **present** in a prokaryotic cell

one structure **absent** from a prokaryotic cell

- (b) With reference to the diagram:

- (i) explain how it is possible to tell that this is a view using an electron rather than a light microscope; [2]

.....

- (ii) State which of the **two** structures **A** to **E** are found in large numbers in a cell with a high level of metabolic activity. Give a reason for **each** choice. [2]

.....

.....

.....

(Total 11 marks)

11.

Complete the table below by ticking (✓) the boxes to show which of the organelles are described by the statements listed. [7]

	<i>Smooth endoplasmic reticulum</i>	<i>Mitochondria</i>	<i>Golgi body</i>	<i>Rough endoplasmic reticulum</i>
Surrounded by a double membrane				
Produces glycoprotein				
Buds off lysosomes				
Manufactures hormones and enzymes				
Most abundant at sites of active transport				
Abundant in cells secreting lipids				
Closely associated with ribosomes				

(Total 7 marks)

12.

Plant and animal cells are described as being eukaryotic. Bacteria are prokaryotic organisms.

- (a) Complete the table below by putting a tick (✓) if the feature is present, or a cross (X) if it is absent. [6]

<i>Feature</i>	<i>Bacterial cell</i>	<i>Palisade cell</i>	<i>Striated muscle cell</i>
cell wall			
large permanent vacuole			
nuclear envelope			
chloroplasts			
mesosomes			
mitochondria			

- (b) (i) State what is meant by the term *tissue*. [2]

.....

.....

.....

- (ii) The biceps muscle in the upper arm consists of striated muscle fibres bound together. Contraction of the biceps results in the forearm being raised.

Would it be correct to classify the biceps muscle as a tissue?
Explain your answer.

[2]

.....

.....

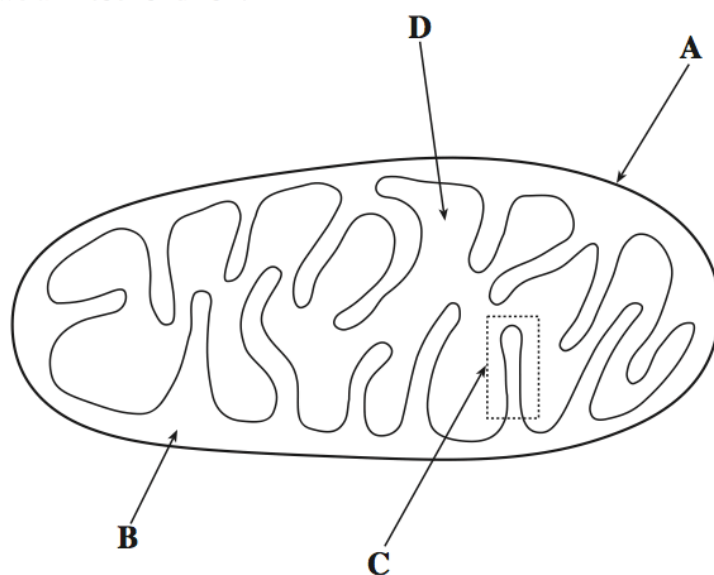
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.....

(Total 10 marks)

13.

The diagram shows a mitochondrion.



- (a) Name the structures labelled **A**, **B**, **C** and **D** on the diagram. [4]

A

B

C

D

- (b) Explain why the inner membrane is highly folded. [2]

.....
.....

- (c) Name the main molecule that is synthesised in this organelle. [1]

.....

- (d) (i) Which of the following cells would contain the greater number of mitochondria? [1]

Skin Cell

Muscle cell

(Circle your choice)

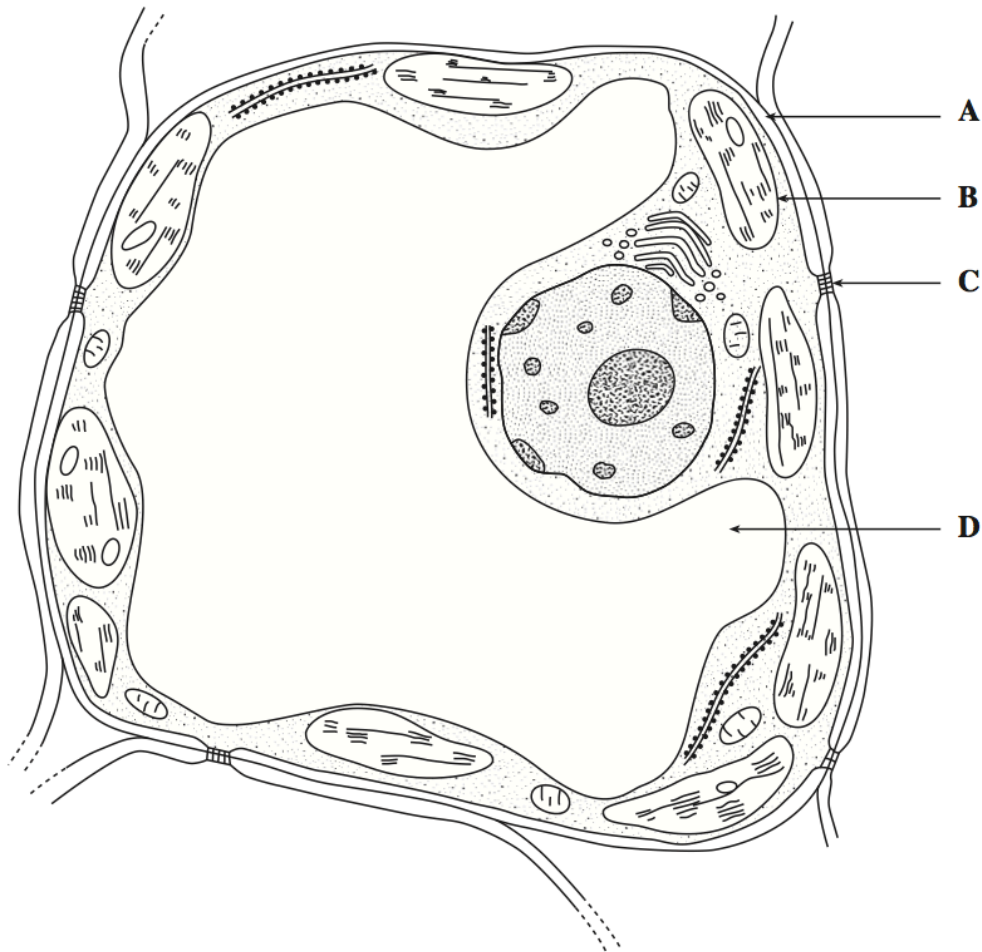
- (ii) Give a reason for your choice. [1]

.....
.....

(Total 9 marks)

14.

The diagram below is of a plant cell as seen under an electron microscope.



(a) Name the structures **A–D** and give **one** function of each.

[4]

A

Function

.....

B

Function

.....

C

Function

.....

D

Function

.....

- (b) State concisely how each of the following structures would be involved in the process of protein synthesis. [7]

Mitochondria

.....

Ribosomes

.....

Endoplasmic reticulum

.....

Golgi body

.....

Cell surface membrane

.....

Nucleus

.....

Nucleolus

.....

- (c) An amino acid was taken up by the cell and incorporated into a protein which was then secreted from the cell. The route taken can be represented by the flow diagram of cell structures shown below.

cell membrane → A → B → C → cell membrane

From the list in (b) identify: [2]

A

B

C

- (d) Name the **carbohydrates** in the cell opposite which are found: [3]

(i) in the cell wall;

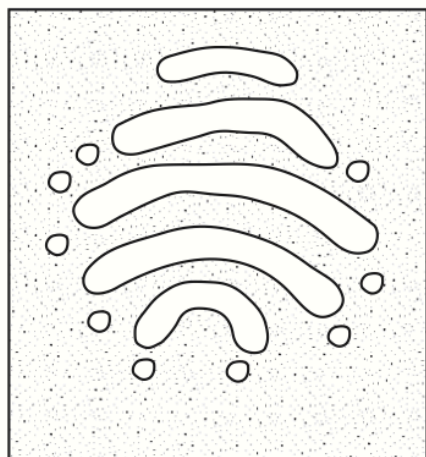
(ii) as a storage compound in the cell;

(iii) as a component of ribosomes.

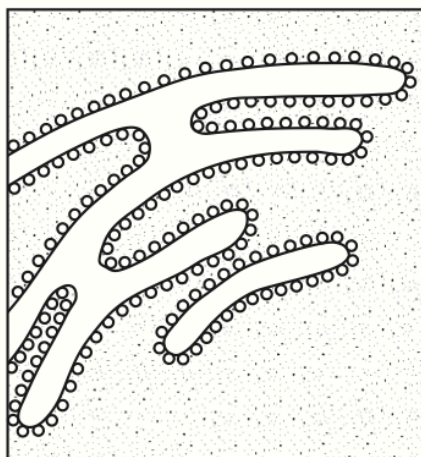
(Total 16 marks)

15.

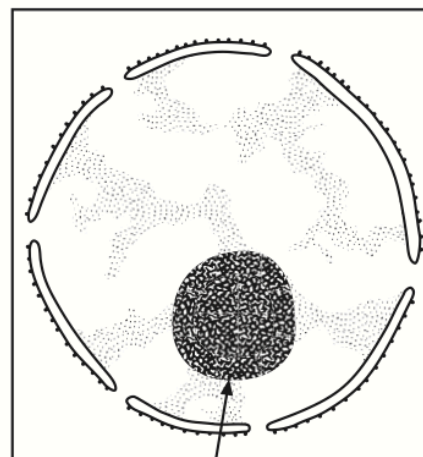
1. The diagrams below show organelles that may be present in plant cells.



A



B



C

Name the organelles and give **one** function for each.

[6]

A Name

Function
.....

B Name

Function
.....

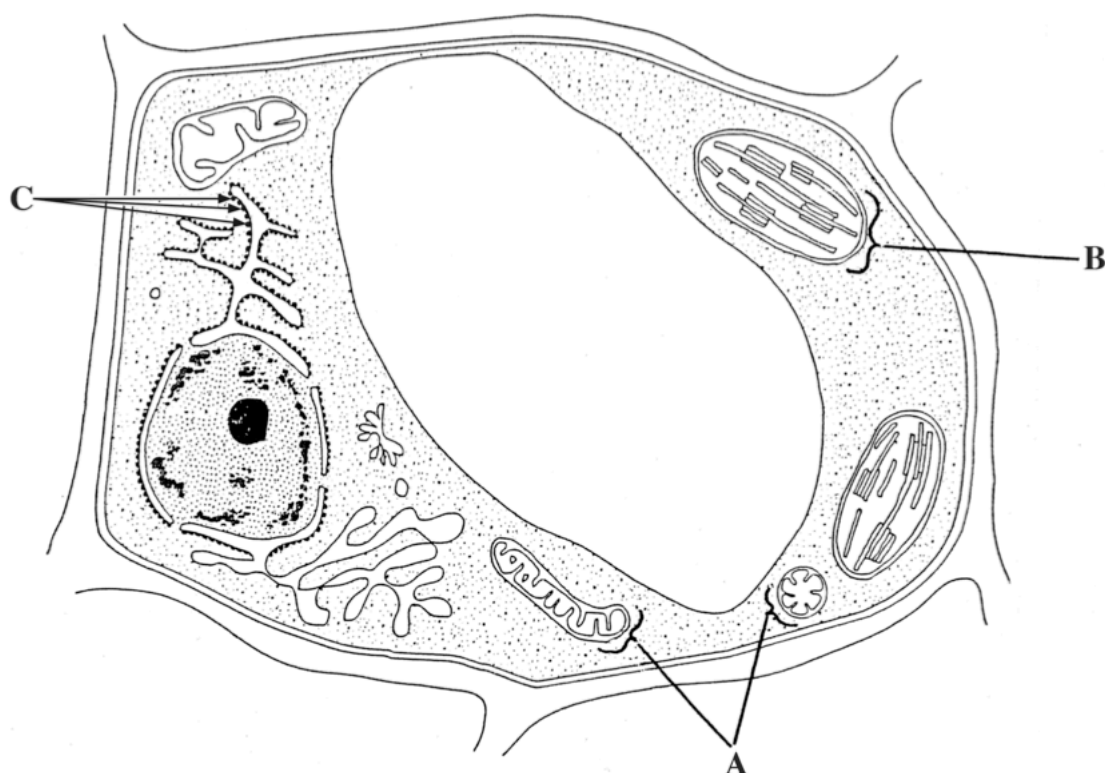
C Name

Function
.....

(Total 6 marks)

16.

The diagram shows the ultra-structure of a plant cell.



- (a) Complete the table by naming and stating the function of each of the organelles labelled A, B and C. [6]

<i>Organelle</i>	<i>Name</i>	<i>Function</i>
A		
B		
C		

- (b) The structures labelled A are identical. Explain why they differ in appearance in the diagram. [1]

.....

.....

- (c) State **two** ways in which an animal cell would differ from a plant cell. [2]

.....

.....

(Total 9 marks)

17.

- (a) The following table compares plant and animal cells. Complete the table by placing a tick (✓) in the appropriate box if the structure is present. Place a cross (✗) in the box if the structure is not present. [2]

<i>Structure</i>	<i>Plant Cell</i>	<i>Animal Cell</i>
Centrioles		
Mitochondria		
Chloroplasts		

- (b) (i) Draw **and label** a diagram to show a section through a typical mitochondrion. [3]

- (ii) What is the function of mitochondria in cells? [1]

.....

- (iii) Name a type of cell in which you would expect to find large numbers of mitochondria. [1]

.....

- (iv) Explain why the cell you have chosen contains large numbers of mitochondria. [1]

.....

.....

(Total 8 marks)

18.

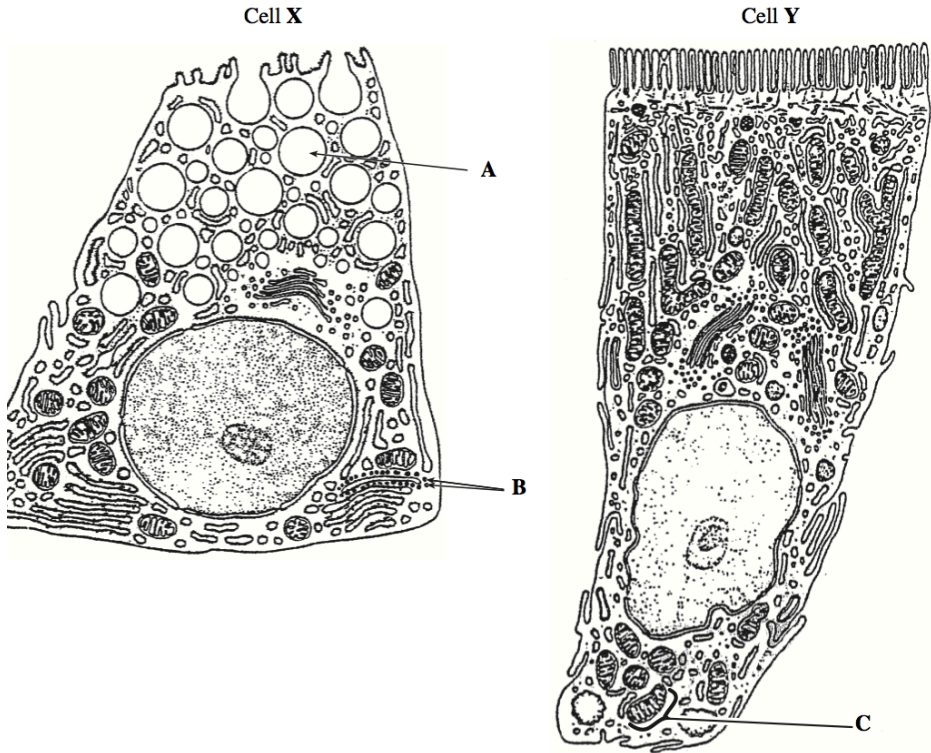
The table below describes structural features and functions of some of the organelles found in eukaryotic cells. Complete the table. [6]

<i>Organelle</i>	<i>Structural feature</i>	<i>Function of feature</i>
Nucleus	Nucleolus	
	Inner membrane folded into cristae	
	Vesicle containing hydrolytic enzymes	Cell lysis
Golgi body		

(Total 6 marks)

19.

5. The diagrams show two cells **X** and **Y**, drawn to the same scale. Cell **X** is a secretory cell. Cell **Y** is involved in absorption.



- (a) Complete the table by describing **three** ways in which the structure of cell **X** differs from the structure of cell **Y**. [3]

<i>Structural component of cell X</i>	<i>Structural component of cell Y</i>
1	
2	
3	

(b) Explain how the labelled structures help each cell to carry out its function. [3]

A

.....

B

.....

C

.....

(c) For cell X, name and describe the process by which secretory products are passed out of the cell. [2]

.....

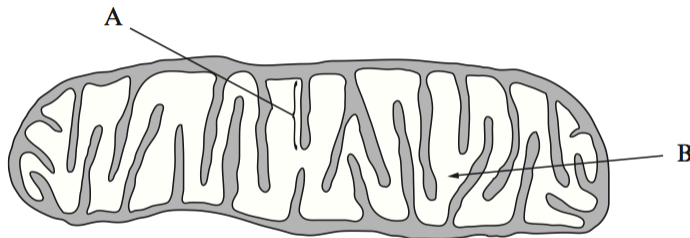
.....

.....

(Total 8 marks)

20.

The diagram below shows an organelle found in a liver cell.



(a) (i) Name the organelle. [1]

.....

(ii) State the function of the organelle. [1]

.....

(iii) Name the structures labelled A and B in the diagram. [2]

A

B

(b) Explain why liver cells have large numbers of these organelles present. [2]

.....

.....

.....

(Total 6 marks)

21.

1. The table below shows some features of prokaryotic and eukaryotic cells. Complete the table to show the differences between the two types of cell.

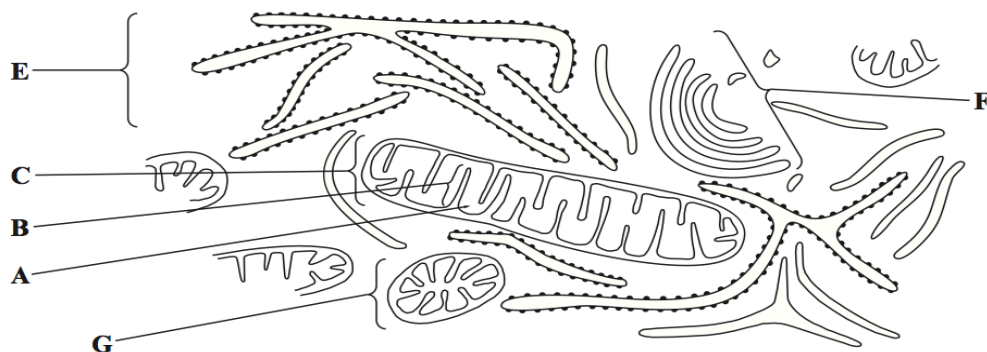
<i>Feature</i>	<i>Prokaryotic</i>	<i>Eukaryotic</i>
Mitochondria		
Arrangement of DNA		DNA forms chromosomes
Position of DNA	Free in cytoplasm	
Composition of cell wall if present		
Size of ribosomes		

[5]

(Total 5 Marks)

22.

The diagram below shows part of a cell that secretes a hormone into the bloodstream.



- (a) Name structures **A** and **B**.

[2]

A

B

- (b) Explain the functions of structures **E** and **F**.

[4]

E

.....

F

.....

- (c) Suggest why this type of cell is likely to contain large numbers of structure **C**.

[2]

.....

.....

- (d) Labels **C** and **G** show the same type of organelle. Explain why they differ in appearance.

[1]

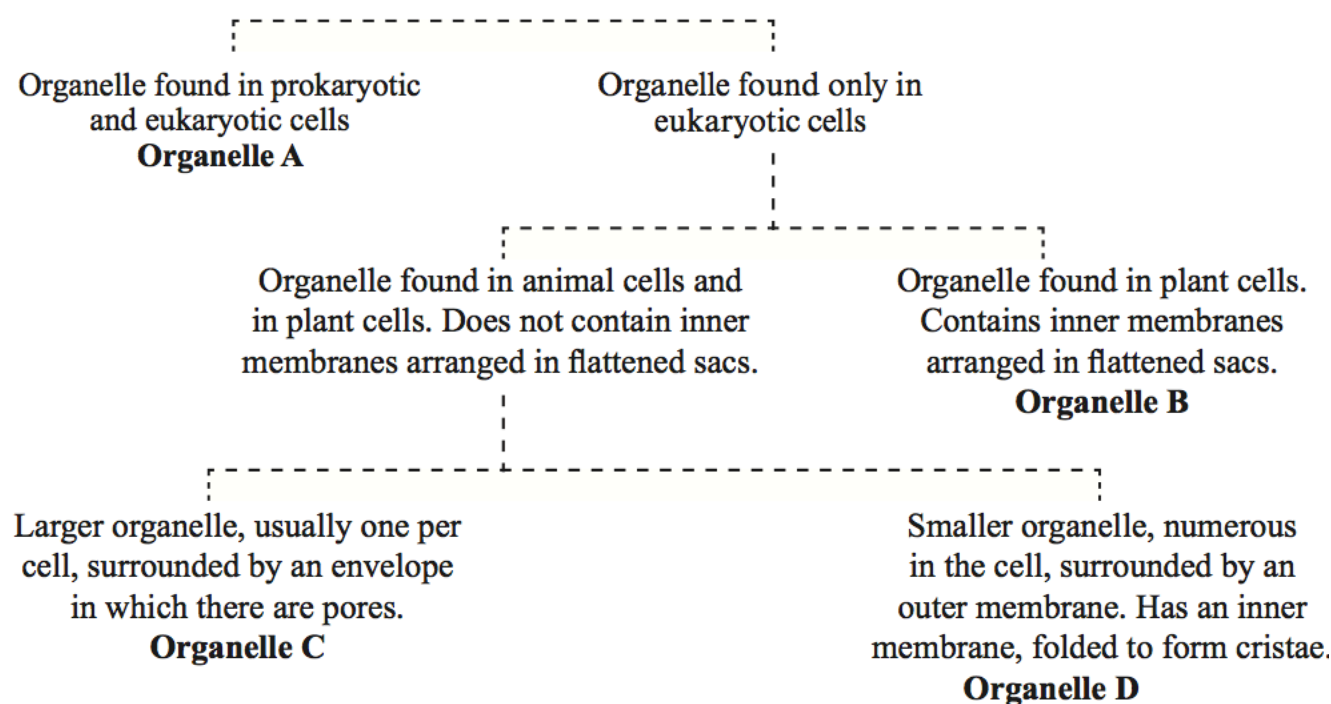
.....

.....

(Total 9 Marks)

23.

The diagram shows how some organelles may be distinguished from each other.



(a) (i) Name organelle **D**. [1]

.....

(ii) Describe the function of organelle **D**. [2]

.....
.....
.....

(iii) Name a cell that contains **large** numbers of organelle **D**. [1]

(b) Which of the organelles **A**, **B**, **C** or **D** is a ribosome? [1]

.....

(c) What is the function of the pores in organelle **C**? [1]

.....
.....

(Total 6 marks)

24.

(a) Name the following:

- (i) A device containing an enzyme that can be used to detect a specific compound in a fluid. [1]

.....

- (ii) An aggregation of similar cells carrying out the same function. [1]

.....

(b) Give **one** structural difference between each of the following:

- (i) prokaryotic and eukaryotic cells; [1]

.....

.....

.....

- (ii) chloroplasts and mitochondria. [1]

.....

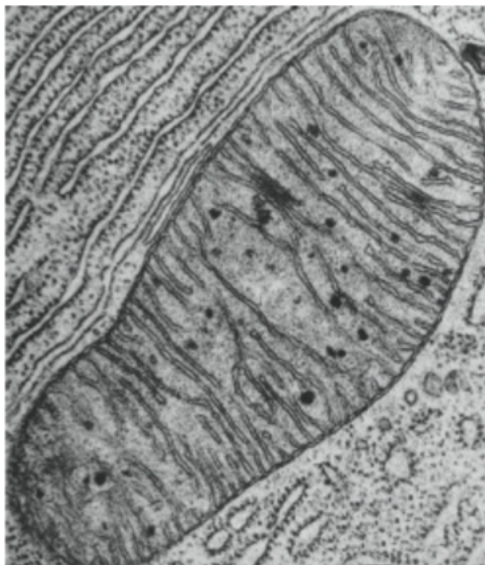
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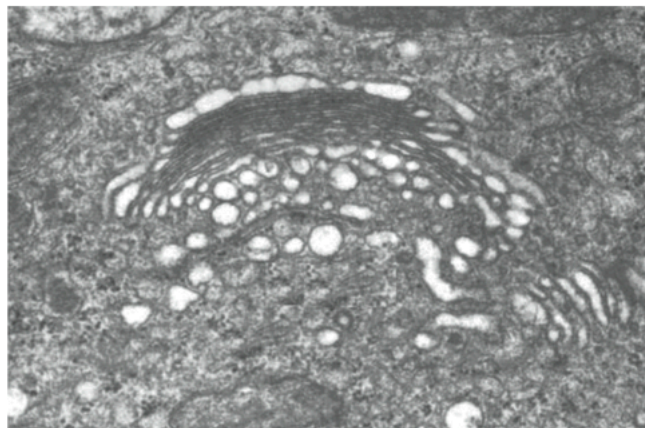
(Total 4 marks)

25.

(a) The electron micrographs below show organelles in eukaryote cells.



A



B

(i) Identify the organelles in photographs **A** and **B** and state their function. [2]

A

Function

.....

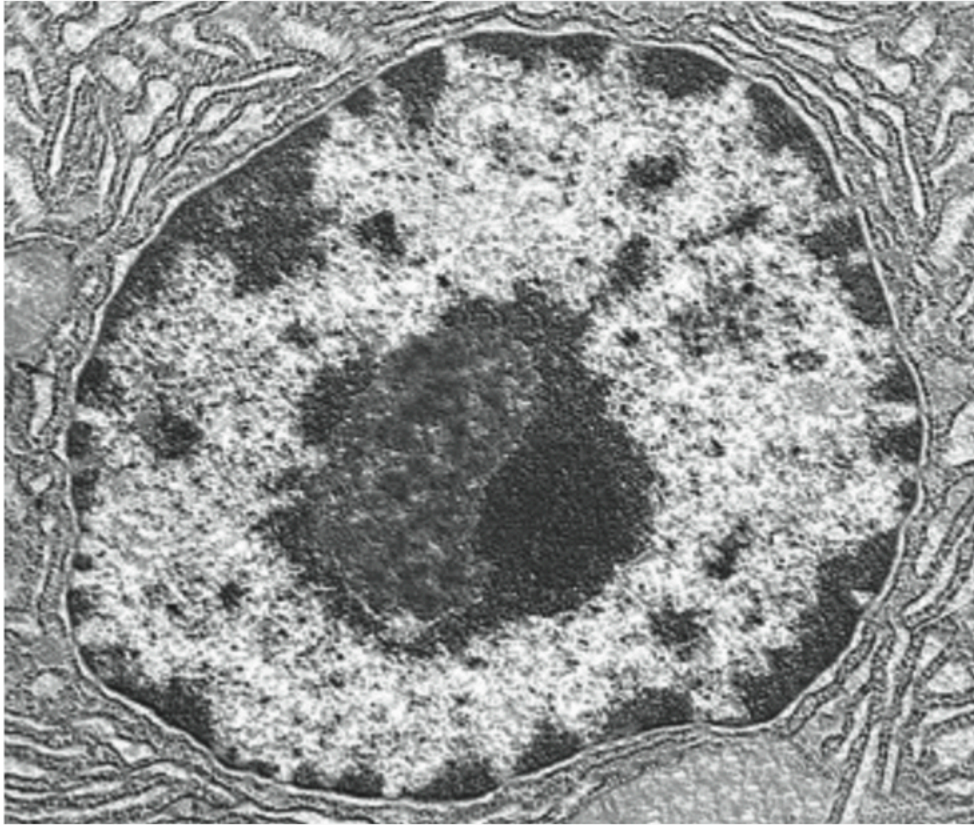
B

Function

.....

(ii) Name a tissue which contains large numbers of the organelle shown in **A**. [1]

.....



C

- (b) Photograph **C** above shows a nucleus. State **two** features of a nucleus that can be seen in this electron micrograph and their function. [2]

Feature 1

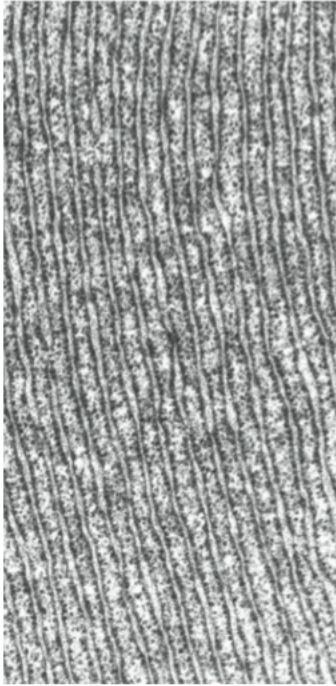
Function

.....

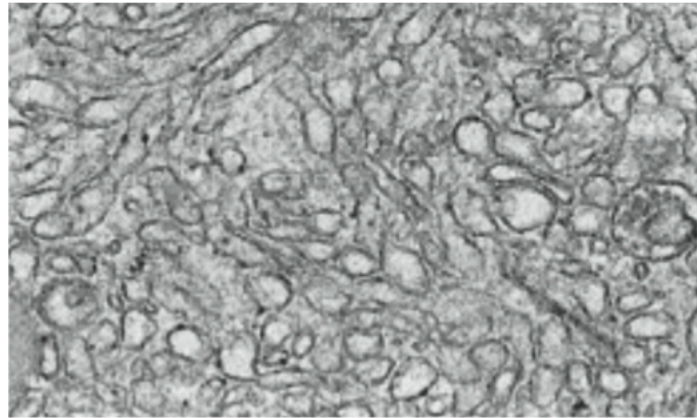
Feature 2

Function

.....



D



E

- (c) Photographs **D** and **E** above show two different types of endoplasmic reticulum. State **two** visible differences between **D** and **E**. [2]

.....

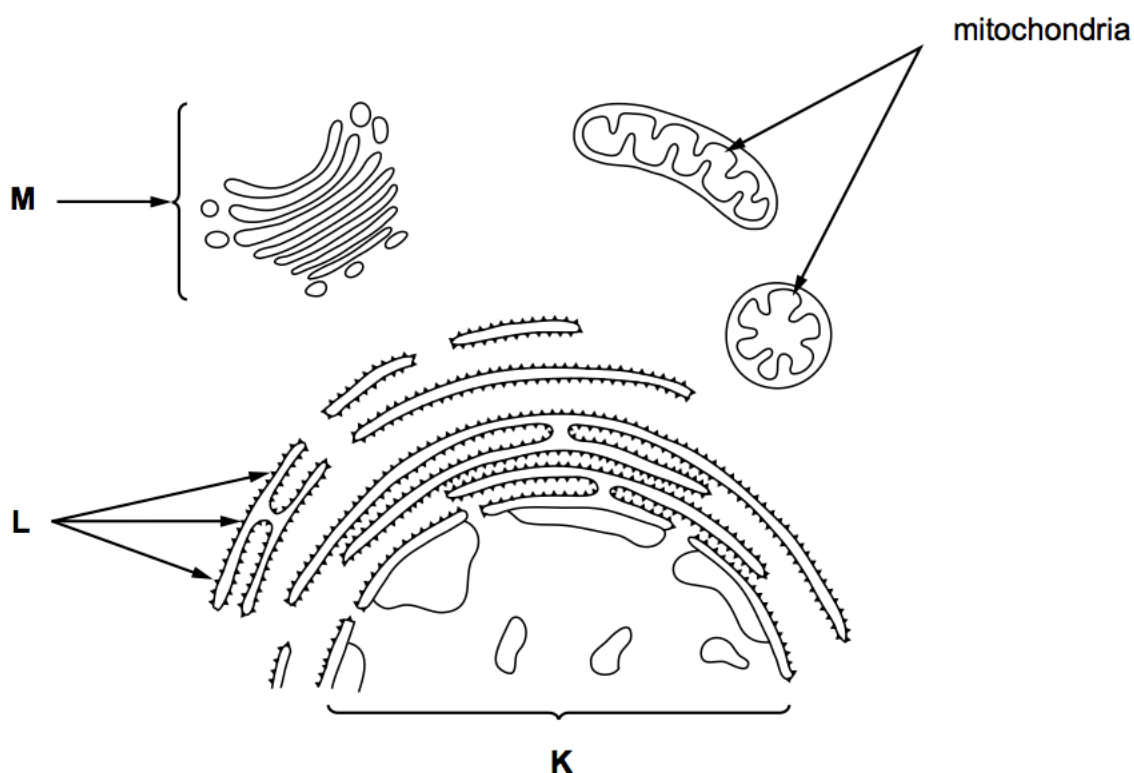
.....

.....

(Total 7 marks)

26.

The diagram below shows part of a generalised animal cell.



(a) Complete the table below.

[6]

Organelle	Name	Function
K		
L		
M		

(b) (i) Explain why the mitochondria labelled in the diagram above appear different from one another. [1]

.....

- (ii) Nearly all eukaryotic cells possess mitochondria. Mitochondria are similar in size to prokaryotic cells and have features in common with them. This led to the biologist, Lynn Margulis, proposing that mitochondria evolved from ancient prokaryotes. The theory of endosymbiosis proposes that these ancient prokaryotes were engulfed by other bacterial cells and both benefited from the relationship – this led to the evolution of eukaryotic cells.

Using your knowledge, state which **two** structures found in prokaryotic cells are also found in mitochondria. [2]

.....

.....

- (iii) Describe **two** differences between mitochondria and prokaryotic cells such as bacteria. [2]

.....

.....

.....

.....

Essays

1.

- (b) With the aid of labelled drawings, compare a mitochondrion and a chloroplast. [10]

2.

- (b) Describe the structure and function of the rough endoplasmic reticulum, golgi and lysosomes. [10]

3.

- (a) Draw a labelled diagram to show the structure of a prokaryote cell. [5]
Explain how a typical eukaryote cell differs from a prokaryote. [5]

4.

- (a) Describe, in terms of structure and function, how mitochondria and chloroplasts are:

(i) different, [5]

(ii) similar. [5]

5.

- (a) Some cells produce and secrete digestive enzymes. Describe the part played by each of the organelles involved in the production and secretion of the enzymes. [10]